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10/642,678	08/19/2003	Stephen G. Holmes	NVID-065/00US	3501

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EXAMINER	
SAUNDERS JR, JOSEPH	
ART UNIT	**PAPER NUMBER**
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/642,678	HOLMES ET AL.	
	Examiner	Art Unit	
	Joseph Saunders	2615	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on August 8, 2007

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-10,12-14,17 and 18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-10,12-14,17 and 18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *19 August 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This office action is in response to the communications filed June 8, 2007. Claims 1 – 10, 12 – 14, 17, and 18 are currently pending and considered below.

Claim Objections

2. Claim1 is objected to because of the following informalities: "audio data streams" is not crossed out in the last line of the claim. Appropriate correction is required.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1, 3 – 9, and 12 – 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Slezak (US 6,647,119 B1), hereinafter Slezak, in view of Sibbald (US 6,498,857 B1), hereinafter Sibbald, and Shaw et al. (US 6,016,515), hereinafter Shaw.

Claim 1: Slezak discloses a method for processing audio data, comprising: presenting a plurality of virtual devices to a user (simulated sound sources), each receiving a selection from the user (via indicator 294), the selection being an association of at least one of a plurality of audio data streams generated by different applications (list of system events 282 from different applications) with at least one of the plurality of virtual

devices (simulated sound sources), each virtual device associated with at least one output audio channel of a plurality of output channels of a sound card (simulated sound sources are audible indicators played through speakers 55A and 55B and therefore are associated with at least one output audio channel of a plurality of output channels of sound card 57); and using a plurality of virtual device drivers (filters) to program the sound card to associate audio data streams of open applications with output audio channels based on the user's selection of virtual devices (Column 4 Line 25 – Column 5 Line 16); and outputting audio from open applications according to the user's selection of virtual devices, wherein the user's selection associates one or more virtual devices with the audio stream of each of one or more applications and audio streams of open applications (Figure 10 and Column 9 – Line 49 – Column 10 Line 14).

Slezak does not disclose the interprocess communications taking place to implement the invention and therefore does not disclose wherein the virtual device drivers write audio data streams from open applications into a system memory accessible by a sound card and at an audio processing unit of the sound card, reading audio data and the virtual device selection from system memory; at the audio processing unit of the sound card, multiplexing audio data streams from open applications based on the user's selection to support simultaneously outputting audio from a plurality of open applications.

Sibbald further discloses how positioning of virtual sound sources is done for more than one signal source. In particular Figure 13 illustrates multiple signal sources S1 – S3 (Which is representative of the audio data streams generated by different

applications), each being processed by a corresponding HRTF (corresponding to a virtual device driver) in order to position the virtual sound sources (corresponding to virtual devices), and then outputs of all of the HRTFs are multiplexed and simultaneously output. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to apply the teachings of Sibbald to the invention of Slezak, since Sibbald illustrates how to apply filters to different sources and multiplex the signals in a manner so that sounds that are intended on sounding as if coming from different positions in space do not end up sounding as if recorded from a single point source (Column 8 Lines 12 – 32).

Sibbald does not teach how to implement HRTFs in a computer system as disclosed by Slezak and therefore also does not teach virtual device drivers that write audio data streams from open applications into a system memory accessible by a sound card and at an audio processing unit of the sound card, reading audio data and the virtual device selection from system memory; at the audio processing unit of the sound card.

However Shaw discloses a system and method for processing sound in a computer system and discloses a way of applying effects to different audio streams before rendering. Shaw teaches that "filter" refers to the portion of the functionality found within a software driver, including the entire driver itself (Column 5 Lines 10 – 25). Shaw also discloses in Figure 2 that in processing audio streams, effects filters (for example the filters or HRTFs) operating in kernel mode (system memory) may have an associated effects processor or the effects filter may operate entirely in software

emulating the actual hardware processor. Therefore, the effects processor writes the processed audio data stream to memory allowing for the sound card to read the processed audio data stream (corresponding to the positioning of the virtual devices based on the user 's selection) and later reading the information from system memory by the sound card where it is simultaneously output.

Therefore well the disclosures of Slezak and Sibbald does not explicitly provide all the necessary information to implement the system; in view of the teachings of Shaw, it would have been obvious to one of ordinary skill in the art at the time of the invention to implement the invention of Slezak and Sibbald with virtual device drivers as disclosed by Shaw performing the effects of the HRTFs disclosed by the system of Slezak and Sibbald on each different applications audio stream in order to position the sound corresponding to the different applications since the disclosure of Shaw provides for a well developed and standardized method of processing audio in a computer environment (Shaw, Column 1 Lines 9 – 16).

Claim 3: Slezak, Sibbald, and Shaw disclose the method of claim 1, wherein presenting includes displaying a list of the plurality of virtual devices on a graphical user interface wherein the graphical user interface associates each of the plurality of output channels with at least one of a plurality of jacks on the sound card (Slezak, Figure 10).

Claim 4: Slezak, Sibbald, and Shaw disclose the method of claim 3, wherein the graphical user interface associates each of the plurality of output channels with at least

one of a plurality of audio devices (speakers 54A and 54B) external to the sound card (Slezak, Figure 2).

Claim 5: Slezak, Sibbald, and Shaw disclose the method of claim 3, wherein the graphical user interface associates each of the plurality of output channels with at least one of a plurality of geographical locations (associated via filters or HRTFs as a result of the user selection; Slezak, Column 4 Line 25 – Column 5 Line 16 and Column 9 – Line 49 – Column 10 Line 14).

Claim 6: Slezak, Sibbald, and Shaw disclose the method of claim 1, wherein receiving includes receiving inputs from the user via a graphical user interface (Slezak, Figure 10).

Claim 7: Slezak, Sibbald, and Shaw disclose the method of claim 1, wherein the each of the plurality of audio streams are associated with one of a plurality of audio applications (Slezak, Figure 10).

Claim 8: Slezak, Sibbald, and Shaw disclose the method of claim 1, wherein receiving includes reading an association of at least two audio data streams with a single virtual device (Shaw discloses that it is possible to mix audio data streams, Column 22 Lines 27 – 34. Also it is well known in the art that a single application may contain multiple

data streams and therefore, as taught by Slezak, would be associated with the single virtual device during the selection by the user.)

Claim 9: Slezak, Sibbald, and Shaw disclose the method of claim 1, wherein outputting includes converting each of the plurality of audio data streams from digital to analog format (Slezak, Figure 2).

Claim 12: A method for processing audio data, comprising: in a sound card, reading a system memory storing a plurality of audio data streams from open applications and a user selection, the user selection being an association of each of the plurality of audio data streams with at least one of a plurality of virtual devices, each of the plurality of virtual devices representative of at least one of a plurality of output channels on a sound card; in an audio processing unit of the sound card, performing audio processing that includes multiplexing the plurality of audio data streams based on the user selection into a multiplexed audio data stream based on the user's selection and writing the multiplexed audio data stream to the system memory: in the sound card, performing an audio codec operation that includes reading the multiplexed audio data stream from system memory and parsing the multiplexed audio stream into a plurality of output data streams, each of the plurality of output data streams being associated with at least one of the plurality of output channels based on the user selection; and outputting audio from open applications according to the user's selection of virtual devices, wherein the user's selection associates one or more virtual devices with the audio stream of each of

one or more applications and audio streams of open applications are simultaneously output.

All of the limitations of claim 12 were addressed in claim 1 above and therefore are rejected for the same reasons.

Claim 13: Slezak, Sibbald, and Shaw disclose the method of claim 12, wherein parsing is based on a predetermined scheme (Audio is parsed to the appropriate speakers based on the HRTF processing as disclosed by Sibbald).

Claim 14: Slezak, Sibbald, and Shaw disclose the method of claim 12, further comprising mixing at least two of the plurality of audio data streams. (Addressed in claim 8 above and therefore rejected for the same reasons).

5. Claims 2, 10, 17, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Slezak, Sibbald, and Shaw, and further in view of Puryear et al. (US 2004/0064210 A1), hereinafter Puryear, and Li et al. (US 5,860,060), hereinafter Li.

Claim 2: Slezak, Sibbald, and Shaw disclose the method of claim 1, but do not disclose the invention further comprising the audio processing unit writing multiplexed audio data streams back to system memory and an audio codec interface of the sound card reading multiplexed audio data streams from system memory and routing signals in the digital domain to a plurality of audio codec DACs to generate analog output channels

according to the user's selection. Puryear discloses more information relating to the implementation of a sound card and discloses that in addition to the architecture discloses by Shaw, with effects filters operating entirely in software or as hardware components separate from the sound card, the effects filters or virtual device drivers can also be included on the sound card and have bi-directional communication with a filter graph stored in system memory and therefore eliminate the need for additional processing components. Therefore it would have been obvious to one of ordinary skill in the art to modify the sound card of the invention of Slezak, Sibbald, and Shaw as disclosed by Puryear to have an audio processing unit of the sound card write multiplexed audio data from to system memory and read multiplexed audio data from system memory before the final step of rendering the output takes place thereby eliminating the need for separate and additional processing components. The invention of Slezak, Sibbald, Shaw, and Puryear, well disclosing rendering the signal through a digital to analog converter however do not show the details of the DAC and therefore do not disclose having a plurality of digital to analog converters for each channel. References such as Li, however disclose that it is well known to have a separate DAC for each output channel (Figure 8). Also note that Li discloses block 530 as a D/A circuit in the singular but it does indeed contain a plurality of DACs 810 and 811. Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to include a plurality of DACs to audio output as disclosed by Li in the system of Slezak, Sibbald, Shaw, and Puryear, since it is well known in the art to use separate DACs after de-multiplexing the audio signal into separate channels (Li, Column 8 Lines 54 – 67).

Claim 10: A system for processing audio data, comprising: a graphical user interface configured to display a plurality of virtual devices to a user, each of the plurality of virtual devices representative of at least one of the plurality of output channels on the sound card, the graphical user interface further configured to receive a selection from the user, the selection being an association of each an audio data stream with at least one of the plurality of virtual devices, the sound card coupled to the graphical user interface to receive the user selection and the audio data streams, the sound card further configured to output the audio data stream based on the selection/and a plurality of virtual device drivers to write digital audio data streams from open applications into the memory and to program the sound card to associate digital audio data streams of open applications with analog output audio channels based on the user's selection of virtual devices: the system outputting audio from open applications according to the user's selection of virtual devices, wherein the user's selection associates one or more virtual devices with the audio stream of each of one or more applications and audio streams of open applications are simultaneously output.

All of the previous limitations of claim 10 along with the limitation a sound card having an audio processing unit to read digital audio data from a memory were addressed in claim 1 above, and claim 2 above addresses the limitation of an audio codec having a plurality of digital to analog converters (DACs) to support a plurality of analog output channels. Therefore claim 10 is rejected for the reasons presented in claims 1 and 2.

Claim 17: A system for processing audio data, comprising: a system memory having a plurality of audio data records from open applications and a user selection, the user selection being an association of each of the plurality of audio data records with at least one of a plurality of virtual devices, each of the plurality of virtual devices representative of at least one of a plurality of output channels on a sound card; an audio processor of the sound card being coupled to the system memory and configured to read the plurality of audio data records and the user selection, the audio processor further configured to multiplex the plurality of audio data records based on the user selection into a multiplexed audio data record; and an audio codec and associated audio codec interface of the sound card being coupled to the system memory and configured to parse the multiplexed audio record into a plurality of output data streams, each of the plurality of output data streams being associated with at least one of the plurality of output channels, the system supporting outputting audio from open applications according to the user's selection of virtual devices, wherein the user's selection associates one or more virtual devices with the audio stream of each of one or more applications and audio streams of open applications are simultaneously output.

All of the previous limitations of claim 17 were addressed in claim 1 above, and claim 2 above addresses the limitation of the audio codec including a plurality of digital to analog converters (DACs) with the audio codec being configured to process the plurality of output data streams and assign output data streams to digital-to-analog

converters associated with output channels defined by the selection. Therefore claim 10 is rejected for the reasons presented in claims 1 and 2.

Claim 18: Slezak, Sibbald, Shaw, and Puryear, and Li disclose the systems of claim 17, wherein the first processor is further configured to mix at least two of the plurality of audio data records (Addressed in claim 8 above and therefore rejected for the same reasons).

Response to Arguments

6. Applicant's arguments with respect to claims 1 – 10, 12 – 14, 17, and 18 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph Saunders whose telephone number is (571) 270-1063. The examiner can normally be reached on Monday - Thursday, 9:00 a.m. - 4:00 p.m., EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sinh Tran can be reached on (571) 272-7564. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JS
August 17, 2007

SINH TRAN
SUPERVISORY PATENT EXAMINER